TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Date: ___Nov 5, 2012_____

Lead Agency (FHWA or State DOT): __South Dakota DOT_____

INSTRUCTIONS:

Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)* TPF-5(054)	Transportation Pooled Fund Program - Report Period ☐ Quarter 1 (January 1 – March 31) X Quarter 2 (April 1 – June 30) ☐ Quarter 3 (July 1 – September 30) ☐ Quarter 4 (October 1 – December 31)
Project Title: **Development of a Maintenance Decision Support System**	

Name of Project Manager(s): **Dave Huft**	Phone Number: **605-773-3358**	E-Mail Dave.Huft@state.sd.us
Lead Agency Project ID: **SD2002-18**	Other Project ID (i.e., contract #) **310814**	Project Start Date: October 14, 2002
Original Project End Date: **April 30, 2003**	Current Project End Date: **September 30, 2012**	Number of Extensions: 29

Project schedule status:

X On schedule   ☐ On revised schedule   ☐ Ahead of schedule   ☐ Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date
$5,476,937.00	$5,319,984.84	97.13%

***Quarterly* Project Statistics:**

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$287,337.48 (5.25%)	$287,337.48	97.50%

Project Description:

- The Maintenance Decision Support System research program is responsible for research and development related to the implementation of new information technologies to support transportation maintenance decisions, including winter and summer decision support tools. The program also performs substantial research and development into parallel applications for the transportation industry that may either share data with MDSS, or benefit by leveraging technologies developed under the program (for instance, sharing of data between MDSS and other agency systems, or the development of management-oriented tools that leverage MDSS' capabilities).

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

- Continued development of MDSS application for Android smartphone and tablet devices. As of the end of Q2 the Android app featured a map-oriented view with selectable map objects, tabular and graphical route views, RWIS and METAR current condition views, and a tie-in to Meridian's METAlerts automatic alerting system. Substantial progress was also made in improving the performance and stability of the Android app during the quarter. The preliminary design process for an iOS-based MDSS app was also initiated during Q2.

- Software enhancements in preparation for release of Version 9.0 of the MDSS GUI continued.

- Operational support, including route additions / configuration adjustments, customer support, and weather forecasting support continued through April 15th of Q2.

- Each agency within the project were provided their operational route configurations at the conclusion of the 2011-12 winter season in order to facilitate route updates for the following winter's operations.

- Efforts were made to update the MDSS GUI Quick Reference guide along with the development of a Quick Reference guide for Management Tools.

- Work continues on the assessment of successes and shortcomings from the PFS MDSS experiences in participating states.

- Mobility Index – The literature search continued on the effects that varying depths of snow, ice, frost, and liquid solutions have on the coefficient of friction.

-Fine-resolution mesoscale model applications: Construction of mesoscale model domains for the Prairie Coteau and Lake Superior were completed. Test of the computational components to support this using the WRF scripts was performed. It was found that the computational requirements to support a 1-kilometer nested domain created a limitation of the current computer cluster. A design was developed to resolve this but this will require expansion of the computing cluster.

Anticipated work next quarter:

- Continue to refine and solicit feedback on an MDSS application for Android smartphone and tablet devices, and commence full-scale development of an iOS-based application to be released later in the year.

- Continue to build out the designed suite of functionality for the combined WMRI and MDC/AVL Management Tools, specifically focusing on evaluating alternate options for tracking winter severity and rounding out the aspects of the MDC/AVL Management Tools that facilitate comparison of maintenance activities against both weather events and guidance provided to snowplow operators via MDSS or other more traditional mechanisms.

- Work to improve upon MDSS' precipitation analysis data based on issues identified during the 2011-2012 winter season, and continue the general process of refinement to other MDSS components based on feedback received.

- Testing of Assessment tool to work out any remaining functionality issues, or documentation issues for users of tool for next winter season.

- Work to continue on defining features to be extracted from mesoscale models to support decision-making during periods of lake effect snowstorms and high-wind events for geographical regions prone to severe wind events. Efforts will include identifying how these mesoscale model features are best incorporated within the MDSS display framework.

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- Mobility Index – The results of the literature review will be converted into mathematical functions that describe the coefficient of friction as a function of the depth of snow, ice, frost, slush, liquids, and mixtures of these components.

- Develop cost estimates for operational deployments in agency for the 2012-13 winter season.

- Establish training schedules with agencies to ensure all agencies receive the necessary training and in a timely manner.

- Transition of mesoscale modeling efforts to identify regions of high winds will be developed and placed into operational status. A method for extracting the modeling output fields for high winds will be developed that snaps the data to MDSS routes. Work will start on defining the needed upgrades to the computing cluster to support lake effect snow, which is performed as a 1-km discretization.

Significant Results:

- Significant results this quarter include the initial release of a prototype MDSS smartphone app as well as a new MDC/AVL-oriented Management Tool.

- Refinement of operational methods for diabatic initialization of mesoscale models to support fine-resolution models.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

- Project was extended 1 year to continue work on the states research priorities and conduct operational field deployment trials.

Potential Implementation:

- The MDSS research program is presently in its 7th phase of work. The core MDSS software / services have been operational within numerous state transportation agencies for several years or more, depending upon the agency.

- An initial suite of "Management Tools" has been implemented within the past several years, starting first with a WMRI tool to aid managers in quantifying winter severity across their jurisdiction from a winter maintenance perspective, followed up more recently by a complementary suite of MDC/AVL-oriented tools analyzing and visualizing maintenance being performed by the agency's MDC/AVL-equipped snowplow fleet.

- Meridian expects that operational Android and iOS MDSS applications will be available by late summer / early fall of 2012.

- Expectation is that operational mesoscale modeling for the fine-scale high wind prediction will start in mid-summer.